

1. (currently amended) A composite material collation machine comprising:
  - a laser diode array for heating at least one fiber tape;
  - a compaction device for pressing the fiber tape against a workpiece in a compaction region such that the fiber tape conforms to the contour of the workpiece and is adhered thereto;
  - an inspection system for monitoring at least one of the fiber tape and the workpiece, the inspection system producing an output representative of at least one characteristic of at least one of the fiber tape and the workpiece; and
  - a controller capable of receiving the output from the inspection system and automatically altering at least one system parameter defining an operational characteristic of the composite material collation machine based thereon,

wherein the laser diode array is configured to irradiate a plurality of irradiation zones such that each irradiation zone can be irradiated independently of the other irradiation zones.
2. (canceled)
3. (currently amended) The composite material collation machine of Claim 2 1 wherein at least one of the irradiation zones defines an area on the fiber tape and at least one of the irradiation zones defines an area on the workpiece.
4. (original) The composite material collation machine of Claim 1 wherein the inspection system further comprises a camera for receiving images of the fiber tape after the fiber tape has passed through the compaction region.
5. (original) The composite material collation machine of Claim 1 wherein the inspection system further comprises a tack monitoring device capable of measuring the molecular mobility of a resin of the fiber tape.

6. (original) The composite material collation machine of Claim 1 wherein the inspection system generates an output representative of at least one characteristic of the fiber tape, the characteristic selected from the group consisting of temperature of the fiber tape, temperature of the workpiece, rate of placement of the fiber tape, compaction pressure, tack of the fiber tape, and placement of the fiber tape relative to another fiber tape.
7. (original) The composite material collation machine of Claim 1 wherein the controller is capable of automatically altering at least one of the system parameters selected from the group consisting of temperature of the fiber tape, temperature of the workpiece, rate of placement of the fiber tape, compaction pressure, tack of the fiber tape, and placement of the fiber tape relative to another fiber tape.
8. (original) The composite material collation machine of Claim 1 further comprising a temperature sensor capable of measuring the temperature of the fiber tape.
9. (original) The composite material collation machine of Claim 8 wherein the temperature sensor is configured to measure the temperature of at least one sensing zone and the controller is capable of automatically controlling the laser diode array to independently irradiate a plurality of irradiation zones, wherein each of the sensing zones and the irradiation zones defines an area selected from the group consisting of an area on one of the fiber tapes and an area on the workpiece.
10. (original) The composite material collation machine of Claim 1 further comprising a marking device responsive to said controller for indicating defects on the fiber tape.
11. (original) The composite material collation machine of Claim 1 wherein the composite material collation machine comprises a fiber tape placement machine.

12. (new) A composite material collation machine comprising:
  - a laser diode array for heating at least one fiber tape;
  - a compaction device for pressing the fiber tape against a workpiece in a compaction region such that the fiber tape conforms to the contour of the workpiece and is adhered thereto;
  - an inspection system for monitoring at least one of the fiber tape and the workpiece, the inspection system producing an output representative of at least one characteristic of at least one of the fiber tape and the workpiece; and
  - a controller capable of receiving the output from the inspection system and automatically altering at least one system parameter defining an operational characteristic of the composite material collation machine based thereon,wherein the inspection system further comprises a camera for receiving images of the fiber tape after the fiber tape has passed through the compaction region.
13. (new) The composite material collation machine of Claim 12 wherein the inspection system further comprises a tack monitoring device capable of measuring the molecular mobility of a resin of the fiber tape.
14. (new) The composite material collation machine of Claim 12 wherein the inspection system generates an output representative of at least one characteristic of the fiber tape, the characteristic selected from the group consisting of temperature of the fiber tape, temperature of the workpiece, rate of placement of the fiber tape, compaction pressure, tack of the fiber tape, and placement of the fiber tape relative to another fiber tape.
15. (new) The composite material collation machine of Claim 12 wherein the controller is capable of automatically altering at least one of the system parameters selected from the group consisting of temperature of the fiber tape, temperature of the

workpiece, rate of placement of the fiber tape, compaction pressure, tack of the fiber tape, and placement of the fiber tape relative to another fiber tape.

16. (new) The composite material collation machine of Claim 12 further comprising a temperature sensor capable of measuring the temperature of the fiber tape.

17. (new) The composite material collation machine of Claim 16 wherein the temperature sensor is configured to measure the temperature of at least one sensing zone and the controller is capable of automatically controlling the laser diode array to independently irradiate a plurality of irradiation zones, wherein each of the sensing zones and the irradiation zones defines an area selected from the group consisting of an area on one of the fiber tapes and an area on the workpiece.

18. (new) The composite material collation machine of Claim 12 further comprising a marking device responsive to said controller for indicating defects on the fiber tape.

19. (new) The composite material collation machine of Claim 12 wherein the composite material collation machine comprises a fiber tape placement machine.

20. (new) A composite material collation machine comprising:  
a laser diode array for heating at least one fiber tape;  
a compaction device for pressing the fiber tape against a workpiece in a compaction region such that the fiber tape conforms to the contour of the workpiece and is adhered thereto;

an inspection system for monitoring at least one of the fiber tape and the workpiece, the inspection system producing an output representative of at least one characteristic of at least one of the fiber tape and the workpiece;

a controller capable of receiving the output from the inspection system and automatically altering at least one system parameter defining an operational characteristic of the composite material collation machine based thereon; and

a temperature sensor capable of measuring the temperature of the fiber tape, wherein the temperature sensor is configured to measure the temperature of at least one sensing zone and the controller is capable of automatically controlling the laser diode array to independently irradiate a plurality of irradiation zones, wherein each of the sensing zones and the irradiation zones defines an area selected from the group consisting of an area on one of the fiber tapes and an area on the workpiece.

21. (new) The composite material collation machine of Claim 20 wherein the inspection system further comprises a tack monitoring device capable of measuring the molecular mobility of a resin of the fiber tape.

22. (new) The composite material collation machine of Claim 20 wherein the inspection system generates an output representative of at least one characteristic of the fiber tape, the characteristic selected from the group consisting of temperature of the fiber tape, temperature of the workpiece, rate of placement of the fiber tape, compaction pressure, tack of the fiber tape, and placement of the fiber tape relative to another fiber tape.

23. (new) The composite material collation machine of Claim 20 wherein the controller is capable of automatically altering at least one of the system parameters selected from the group consisting of temperature of the fiber tape, temperature of the workpiece, rate of placement of the fiber tape, compaction pressure, tack of the fiber tape, and placement of the fiber tape relative to another fiber tape.

24. (new) The composite material collation machine of Claim 20 further comprising a marking device responsive to said controller for indicating defects on the fiber tape.

25. (new) The composite material collation machine of Claim 20 wherein the composite material collation machine comprises a fiber tape placement machine.